

RESEARCH ARTICLE

Diversity of Crabs (Portunidae) in Royapuram Coast of Chennai, India

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ABSTRACT

Marine crabs are globally distributed in different depths and different habitat in the marine environment. The present work was undertaken to study the biodiversity of crabs collected from Royapuram fish harbour Chennai North East coast of India. Collected samples were taken to the laboratory for identification and further analysis with common systematic keys. Five species of crabs belonging to 3 genera and family Portunida has been identified from the samples. The species are *Portunu spealgicus*, *Portunus sanguinolentus*, *Scylla serrate*, *Scylla tranquebarica* and *Charybdis feriatus*. The understandings of the relationships between biodiversity and ecosystem functions are thus essential for the conservation and sustainable management of coastal areas.

Key words: Marine crabs, biodiversity, ecosystem.

1. INTRODUCTION

Among benthic communities, crustaceans are important members because more number of species present for human consumption and a tremendous variety of small species contribute to the complexity and functioning of tropical ecosystems^[1]. Tropical and subtropical regions have more number of crab species compared to temperate and cold regions^[2,3]. There are around 62 species of crab found in British waters and approximately 4,500 known types of crab worldwide.

A total of 226 species of brachyuran crabs belonging to 130 genera and 39 families have been recorded from the different maritime states of the west coast of India. Highest species diversity recorded in Kerala (93 species) followed by Maharashtra (92 species). However, generic diversity is more in Maharashtra (64 genera) than in Kerala (63 Genera). Of the 39 families namely, pseudoziidae and Trapeziidae, known only from Maharashtra and the family Gecarcinidae from Goa. Among the states in the west coast of India, three brachyuran families, viz., Homolodromiidae, Atelecyclidae and Goneplacidae are recorded only from the state of Kerala; their representatives do

not occur in the east coast but are found only in the Andaman and Nicobar Islands and Lakshadweep within Indian territorial waters. Among the 39 families, the family Portunidae contains the maximum number of species (28) followed by Xanthidae (23 species) and Leucosiidae (22 species). The genus *Charybdis* supports the maximum number of species (11) in the west coast^[4].

Crabs belong to a group of animals called 'decapods' meaning ten legs. This group also includes lobsters, shrimps, and prawns. Crabs are encased in a hard, protective shell, which acts like a suit of armour often with spines or teeth. They have a pair of claws that they use to catch, chop and crush prey. The claws are also used to fight or communicate.

Several species of crabs were reported in Chennai coast^[5,6,7]. Gulf of Mannar areas [8], Pondicherry mangrove areas^[9], Pichavaram mangrove areas^[10,11] and Parangipettai coast^[12,13].

Crabs are one of the ecologically important faunal communities in the marine ecosystem. The crabs play a significant role in detritus formation, recycling of nutrients and overall dynamics of

ecosystems. Keeping in view the importance of crab in the ecosystem and the revenue generated from crab fishery, an attempt was made to investigate the species of crabs available at Royapuram fishing harbour, Chennai, Tamil Nadu.

2. MATERIALS AND METHODS

Study area

Royapuram fishing harbour, also known as Chennai fishing harbour or Kasimedu fishing harbour, is one of the major fishing grounds for catching fishes and crustaceans located at Kasimedu in the Royapuram area of Chennai, India. The Royapuram fishing harbour is located along the Chennai port (Lat 13° 7'48.47"N and Long 80°18'12.32"E) and is under the administrative control of the Chennai Port Trust. All the ports are manmade and are characterized by the presence of backwaters. The harbour is also a shipbuilding facility, chiefly building fishing boats.

Raw municipal sewage, industrial trade effluents, industrial cooling waters, oil from boat repair, fish cleaning wastes etc., are some of the wastewater discharges into the coastal water of North Chennai between the Royapuram fishing harbour and the Ennore port. The Royapuram sewage outfall discharges mostly untreated municipal sewage directly into the coastal waters. It is enclosed by backwaters on either side with a ground area of 24 hectares and water spread of 48 hectares. It has a long jetty 495m in length and water depth is done to keep the bar mouth always open to facilitate proper drainage of river waters into the sea.

Sample collection

The present study is based on surveys conducted; information gathered from fishermen and knowledgeable persons as well as literature study and collections is carried out during December 2015 and January 2016 from Royapuram fishing harbour Chennai North East coast of India. Crab samples were collected from the above study area from inter-tidal and sub-tidal regions. The entire collected samples were taken to the laboratory for further analysis. Common systematic keys used for collected sample identification ^[14, 15].

3. RESULTS

In the present study, five species of crabs belonging to three genera and family Portunidae has been listed from Royapuram coastal area. The species identified were *Portunus spelagicus*,

Portunus sanguinolentus, *Scylla serrate*, *Scylla tranquebarica* and *Charybdis feriatus* (Table 1).

The chief characteristics of the family portunidae are hexagonal carapace, transversely ovate to transversely hexagonal, sometimes circular; dorsal surface relatively flat to gently convex, usually ridged or granulose; front broad, margin usually multidentate; usually 5 to 9 teeth on each anterolateral margin, posterolateral margins usually distinctly converging. Endopodite of second maxillipeds with strongly developed lobe on inner margin. Legs laterally flattened to varying degrees, last 2 segments of last pair paddle-like. Male abdominal segments 3 to 5 completely fused, immovable.

***Portunus pelagicus* (Linnaeus, 1758)** A medium-sized marine nocturnal crab (CL males: 7 cm, females: 6.5 cm), carapace greenish-brown with irregular pale mottling edged dark brown, chelipeds are purplish, mottled and fingers blue. Active swimmer, but during inactive periods buries in sediment. Carapace very broad; nine anterolateral teeth and the ninth one stout and long; posterior border of the arm of the cheliped with a spine at the distal end; chelipeds and walking and swimming legs long and the chelipeds longer than legs; body colour dark grey with several irregular markings all over carapace. Carapace rough to granulose, front with 4 acutely triangular teeth; 9 teeth on each anterolateral margin, the last tooth 2 to 4 times larger than preceding teeth. Chelae elongate in males; larger chela with conical tooth at base of fingers. Colour: Males with blue markings, females dull green/ greenish brown

Common name: Blue Swimming crab (Fig 1a,b)

Geographical Distribution:

Indo-Pacific Ocean, Red Sea to Tahiti, Levant Sea and Sicily. Recorded from the Mediterranean coast of Egypt in 1898. Successively from Israel, southern Turkey, Lebanon, Syria, Cyprus, Sicily. Veraval, Mumbai, Goa, Karwar, Mangalore, Kozhicode, Cochin, Kollam, Vizhinjam, Kanyakumari, Tuticorin, Mandapam, Kodiakkarai, Tranguabar, Nagapatinam, Parangipettai, Cuddalore, Puducherry, Kovalam, Chennai, Kakinada, Visakhapatnam, Puri, Paradeep, Sandheads and Lakshadweep, Andaman and Nicobar Islands.

Economic importance:

Large quantities of the species are caught in the mechanized trawling along Kerala, Tamil Nadu and Andhra Pradesh coasts.

***Portunus sanguinolentus* (Herbst, 1783)**

Carapace finely granulose, regions just discernible; 9 teeth on each anterolateral margin, the last tooth 2 to 3 times larger than preceding teeth. Chelae elongated in males; larger chela with conical tooth at base of fingers; pollex ridged. Colour: olive to dark green, with three prominent maroon to red spots on posterior 1/3 of Carapace.

Common name: Three Red Spots Swimming crab (Fig 2)

Geographical Distribution: In India Veraval, Mumbai, Goa, Karwar, Mangalore, Kozhicode, Cochin, Kollam, Vizhinjam, Kanyakumari, Tuticorin, Mandapam, Kodiakkarai, Tranguabar, Nagapatinam, Parangipettai, Cuddalore, Puducherry, Kovalam, Chennai, Kakinada, Visakhapatnam, Puri, Paradeep, Sandheads and Lakshadweep, Andaman and Nicobar Islands.

Economic importance:

Large quantities of the species are caught in the mechanized trawling along Karnataka, Kerala, Tamil Nadu and Andhra Pradesh coasts.

***Scylla serrata* (Forsk., 1755):**

Carapace smooth, with strong transverse ridges; H-shaped. Gastric groove deep; relatively broad frontal lobes, all more or less in line with each other; broad anterolateral teeth, projecting obliquely outwards, colour green to greenish black; legs may be marbled. Well-developed spines present on outer surface of chelipedal carpus and anterior and posterior dorsal parts of palm. Its antero-lateral borders being cut into nine sharply acuminate teeth of about equal size can distinguish it. Colour a uniformly dark greenish grey. It is the common edible crab of India, which is commercially important, being available in large quantities throughout the year. It is fished along the entire coast of India and the East Indies, especially Java. It reaches a length of eight to nine inches and may weigh two to three pounds. The anterior male abdominal appendages are elegantly bent and bear hairs along one border and spinules along the other. The tip is shaped like a scalpel and bears a patch of spinules. It is found all over the Indo-Pacific region, from the Red Sea, east coast of Africa, India, Japan.

Common name: Mud or red crab (Fig 3)

Geographical Distribution:

In India Veraval, Mumbai, Goa, Karwar, Mangalore, Kohicode, Kochi, Kollam,

Manakkudy, Tuticorin, Mandapam, Parangipettai, Cuddalore, Chennai, Lake Pulicat, Kakinada, Visakhapatnam, Lake Chilka, Hugli-Matlah estuary, Andaman and Nicobar Islands.

Economic importance: Commercially exploited in all the estuaries and east & west coasts of India.

***Scylla tranquebarica* (Fabricius, 1798):**

Colour varies from brown to almost black in coloration, and has very well-developed spines on the outer surfaces of the chelipedal carpus and the palm (as seen in *S. serrata*). It differs from *S. serrata*, however, by having the frontal teeth more acutely triangular, the median pair projecting slightly forwards of the lateral pair, and the anterolateral teeth gently curving anteriorly, giving the Carapace a less transverse.

Common name: Mud or green crab (Fig 4)

Economic importance:

Exploited heavily from inshore and brackish water environments by indigenous gears.

***Charybdis feriatus* (Linnaeus, 1758):**

Carapace ovate; 5 distinct teeth on each anterolateral margin. Colour: distinctive pattern of longitudinal strips of maroon and white, usually with distinct cross on median part of gastric region; legs and pincers with numerous scattered white spots. This species can be identified by its typical colouration pattern (Fig 5a,b).

Geographical Distribution:

In India the cross crab is called Karchala in Gujarathi (G), Khekhada in Marathi (Mr), Kurisunjandu in Malayalam (M), Siluvainandu in Tamil (Tn), Kankda in Oriya (O) and Kankra in Bengali (B). The vernacular name of the blue crab is Khekhada (Mr), Kavalannjandu (M), Olakkalnandu (Tn), Gelaipeeta (T), Chitrakankda (O) and Naksakankra (B).

Economic importance: Commercially exploited in all the estuaries and east & west coasts of Indian.

Table 1: Distribution of crab species (Portunidae) from Royapuram, Chennai

Family	Genus	Species
Portunidae	<i>Portunus</i>	<i>Pelagicus sanguinolentus</i>
	<i>Scylla</i>	<i>Serrate tranquebarica</i>
	<i>Charybdis</i>	<i>feriatus</i>



Fig 1(a): *Portunu spelagicus* (male)



Fig 3: *Scylla serrata*



Fig 1(b): *Portunu spelagicus* (female)



Fig 4: *Scylla tranquebarica*



Fig 2: *Portunus sanguinolentus*



Fig 5 (a) *Charybdis feriatus*



Fig 5 (b): *Charybdis feriatius*

4. DISCUSSION

Chennai coast is known for its rich biodiversity. It is also the zone of maximum human concentration. The problems in the zone are due to conflicting sectorial interests. There are several stakeholders representing both, the Government Departments and NGOs. The traditional fishermen and trawler operators exploit the living resources along the Chennai coast to the maximum. Nevertheless, one thing is certain, coastal biodiversity is threatened by pollution especially from domestic sewage and run off from agricultural land. Destruction of habitat is another serious problem along the Chennai coast. The traditional users of the Chennai Coast feel that they are marginalized. Many fishermen living along the Chennai Coast are ignorant of the Wildlife (Protection) Act 1972 and Coastal Regulation Zone Notification. Socio-economic evaluation of coastal resources and public involvement in the management are the two aspects, which may have to be considered for conservation and management of faunal resources of Chennai coast.

The biodiversity is important for human survival and economic interests and for the environmental purpose and stability. India's marine and coastal ecosystems constitute an important natural resource, since millions of people dependent on them for their livelihoods. This rich biodiversity has a significant role in the maintenance of the ecosystem. Crustaceans are visibly a remarkable group of organisms with a long evolutionary history and prominent adaptability [16, 17]. The decapod crabs are mostly active animals with complex behaviour patterns [18].

It is evident from the present investigation the five species collected from Royapuram coastal area viz. *Portunuspelagicus*, *portunussanguinolentus*, *Scylla serrate*, *Scylla tranquebarica* and *Charybdis feriatius* are commercially important species along the North coast of India.

Among the five species, the blue swimming crab, *Portunuspelagicus* represents a valuable component of small-scale coastal fisheries in many countries in the tropic [19-22]. The crabs are harvested using traps, beach seine nets and bottom-set gillnets [23]. None of the Indian brachyuran crabs is in the IUCN list. Thus, at present, there is no ban on fishing immature and the berried crabs and the minimum size at capture is not implemented in India. However, as a conservation measure, recently CMFRI has suggested minimum legal size at fishing for important fishery resources for Kerala state. Further, it is important to educate fishermen to release the juvenile, berried and soft crabs to the sea while they are alive. The best method to ensure a sustainable fishery throughout the year as well as to improve the quality of the yield is that government ought to take appropriate measures to ban fishing and marketing of undersized and berried crabs.

Charybdisferiatius [24] is a portunid crab species widely distributed in the Indo- Pacific region [25]. It usual occurs sublittorally on muddy and Sandy bottoms, as well as on rocky and stony coasts including coral reef flats, at depths of approximately 10-60 m. This species of *Charybdis* as a high commercial value and it is usually sold frozen. However with the recent expansion of live fishmarkets, this species is now maintained in aquaria and holdtanks, and exported throughout eastern Asia [25,26], *Charybdis hellerii* [27].

In the present study, the results showed some decapod species found in a given area and are often in low diversity that productivity is highest and human exploit of these systems for food and other uses. Water quality is the important parameters that determine the life of crab species and due to the plant, ecosystems are important for fishery production [28-31] (Tiwari, 2011; Zhang *et al.*, 2011; Srinivasamoorthy *et al.*, 2012; Wu and Zhang, 2012). They are serving as home, nursery, feeding and breeding grounds for many crustaceans. The disturbance activities of anthropogenic, overharvesting and habitat loss often occur simultaneously, as removal of a living being from its environment can have irreversible

impacts on the environment itself. The biodiversity loss and degradation of ecosystem functions do not occur independently, but are highly interrelated to each other.

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